February 10, 2008

Mr. Craig Wilkinson
TIMET
PO Box 2128
Henderson, NV 89009

Re.: Nevada Division of Environmental Protection Letter Regarding:
2007 Conceptual Site Model (CSM), Response to NDEP Comments dated September 24, 2007; Dated December 7, 2007
NDEP Facility ID# H-000537

Dear Mr. Wilkinson:

The Nevada Division of Environmental Protection (NDEP) has completed a review of the aforementioned document and provides comments in Attachment A. Instructions for responding to this letter are also detailed in Attachment A.

Should you have any questions or concerns, please do not hesitate to contact me at (702) 486-2850 x247.

Sincerely,

Brian A. Rakvica, P.E.
Supervisor, Special Projects Branch
Bureau of Corrective Actions

BAR:s

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Attachment A

1. General comment, the comment numbers identified below are the comment numbers from TIMET's December 7, 2007 letter.
2. General comment, in the response to this letter, please include the full annotation and development of each of the comments, tracing back to the NDEP's original letter on the CSM.
3. Response to comment (RTC) 1.a.iv., Figure 3-4a was not provided with the revised submittal. Please includes this in the response to this letter.
4. RTC 1.a.vi.2 (response to previous RTC 19a), NDEP disagrees with TIMET's response to this question. The continuity of the sand lenses within the upper portion of the MCF is a data gap until proven otherwise.
5. RTC 2, A formal data gap analysis should be conducted that uses all known information regarding each source and includes some level of data usability evaluation.
6. RTC 8 (previous RTC 20d), TIMET should recognize that their answer in the subject document digresses significantly from their response on August 6, 2007 letter to the NDEP. The original question and TIMET's response is copied below for ease of reference.

   NDEP #20d. Page 2-9, 5th bullet, TIMET states "The flux of groundwater through the alluvial aquifer appears to be far more than can be sustained by natural recharge, and is thought to be related to upslope irrigation infiltration." Does TIMET have information to document inflow from upgradient, off-site sources? What about potential on-site sources?

   TIMET Response #20d. TIMET will consider other sources including but not limited to:

   - Storm water infiltration through preferential pathways
   - Pipeline breaks and leaks from adjacent properties

   Based on TIMET's response to the NDEP's original question, the NDEP provided the following response in its September 24, 2007 letter to TIMET.

   NDEP response. RTC 20d, please consider the development of a site-wide, analytical water budget. NDEP expects that the schedule for submittal of this item will be identified in the response to this letter.

   TIMET's response on December 7, 2007: "The required degree of accuracy and end use of a water budget must be carefully considered by all parties if TIMET is to develop one." The following quote comes from TIMET's CSM dated April 25, 2007. "As such, this document was written to achieve the following objectives: (1) integrate technical information from various sources, (2) identify data needs and serve as a guide for future data collection activities, and (3) *evaluate (qualitatively) the risk to human health and the environment posed by a contaminated site* (Italic emphasis added)."

TIMET indicates that they plan to evaluate risk to human health and the environment. EPA (1989) recognizes that contaminant fate and transport issues need to be addressed in risk assessment. To accomplish the latter the groundwater flow system must be understood and a water budget is an integral part of that process. In conclusion, the NDEP fails to see the value in conducting a qualitative risk assessment for this site. Additional comments are provided below.

a. First bullet in TIMET's RTC.

This discussion ignores the fact that constant head boundaries create a flux in the model. Furthermore, a water budget is calculated within numerical models such as MODFLOW. A requirement of the model is that inflows and outflows must balance to within a specified percentage. In the case of the Athens Road model, the difference between inflows and outflows was specified at less than 0.1%. Thus, TIMET's statement that a water budget was not developed is not accurate.

b. Second bullet in TIMET's RTC.

Both the USEPA and NDEP recognize that demonstrating plume capture requires multiple lines of evidence (EPA, 2002). These lines of evidence can include:

i. Flow budget and analytical modeling,
ii. Potentiometric surface maps,
iii. Groundwater elevation pairs,
iv. Sentinel wells,
v. Particle tracking in conjunction with groundwater flow modeling, and
vi. Tracer tests.

Several of the methods recommended (flow budget, analytical modeling, and particle tracking and flow modeling) involve making assumptions and using professional judgment in regards to the hydraulic system. Therefore, the USEPA and NDEP require multiple lines of evidence. Three of the methods recommended (potentiometric surface maps, groundwater elevation pairs, and sentinel wells) involve fewer assumptions about the hydrogeologic system under investigation.

The foregoing is pointed out to indicate that numerical modeling is not proof of capture but another line of evidence to indicate capture. There is no logical connection between how well the Athens Road Well Field numerical model depicts either particle or plume capture and TIMET independently developing a water budget for their site.

c. Third bullet in TIMET's RTC.

NDEP recommends that TIMET examine Table B-1 in the referenced document. Upon closer examination TIMET will discover that Tronox used a horizontal hydraulic conductivity to calculate vertical flow. This problem has been communicated to Tronox. Subsequently, Tronox has indicated that if typical vertical hydraulic conductivity values were used in this calculation, they would not be able to account for all the groundwater captured at the On-Site Interceptor Well Field. Consequently, Tronox has agreed to investigate the vertical hydraulic conductivity for the MCF.

In regards to the comparison with the modeling for the Athens Road Well Field, the no flow boundary was based upon lithologic descriptions of the MCF in the area of the model domain. The conclusion was that vertical flow from the MCF would be a minor component of the horizontal flow in this area.

Given the information available the NDEP does not believe that there is a discrepancy in hydraulic relationships when the evidence is properly evaluated. Thus the conclusion to this bulleted item is not well founded.

In conclusion to RTC 8 (20d), the NDEP's finds that there was insufficient data in the CSM to conclude that recharge from upgradient irrigation is the likely cause of the higher groundwater flux.

7. RTC 11 (previous RTC 30), please note that all available data should be included in the current CSM and used to support source analysis.
8. RTC 12, (previous RTC 33), please note that a key objective of the CSM is to identify data gaps, which include depths of proposed sample locations. CSM-related information regarding sources, release and transport mechanisms, and receptor locations should be employed in identifying appropriate sample depths.
9. RTC 13 (previous RTC 34a), please note that with few exceptions (which must be appropriately justified and approved by the NDEP), broad suites will be a necessary component of site characterization. This is specified in USEPA risk assessment guidance.
10. RTC 15b, the NDEP has the following comments:
    a. TIMET has not responded to the NDEP's comment regarding waste stream analysis. In addition, it is not apparent that the response is consistent with discussions that have been on going. TIMET instead chose to defer the issue of waste stream analysis versus broad suite analyses to "future SAPs". This is not helpful for project planning. It is expected that this issue will be brought to resolution during a meeting to be **scheduled by February 29, 2008**.

b. TIMET must follow site characterization requirements for health risk assessment (HRA). The sooner a data usability evaluation is conducted using the existing information, the sooner the HRA data gaps can be identified. NDEP cannot accept a HRA or HRA work plan that is not based on adequate data.

11. RTC 15c, similar to RTC 15b, TIMET has not responded to the NDEP's comment. Instead of providing a cross-reference or presenting the data that was requested TIMET has chosen to defer this issue to "future SAPs". This is not helpful for project planning. It is expected that this issue will be brought to resolution during a meeting to be **scheduled by February 29, 2008**.
12. RTC 15d, the NDEP has the following comments:
    a. Instead of responding to the NDEP's request for a decision tree TIMET has chosen to defer this issue to "future SAPs". This is not helpful for project planning. It is expected that this issue will be brought to resolution during a meeting to be **scheduled by February 29, 2008.**
    b. If the application of a decision tree, data usability evaluation, and data gap analysis is not going to be incorporated into the comprehensive CSM for the site, then a candidate source area should be identified in the near future and these steps should be performed for that area in order to document to NDEP that the process will be conducted in accordance with risk-based methodology.
13. RTC 16b (previous RTC 36a), TIMET should be clear as to how "trespass chemicals" and "background concentrations" are being defined in their response. For example, a chemical can originate from an off-site anthropogenic source and be present on-site at concentrations greater than background.
14. RTC 18 (previous RTC 42), in the future please do not include hypotheses that have no basis in data. No response is required.
15. RTC 21 (previous RTC 50c), TIMET's response does not address NDEP's request to define "as appropriate".
16. RTC 24 (previous RTC 55a), NDEP notes that the format and content of this RTC is helpful. Specifically, directing the NDEP to the appropriate location on Table 6-1, however, TIMET's response does not address NDEP's previous comment 55a , which is specific to the potential for PAHs to have been released on-Site.
17. RTC 26, The NDEP is uncertain about the distinction that TIMET is attempting to make by adding a pathway classification of "important." The current RTC digresses from the issue. TIMET should use the accepted classification scheme of potentially complete, complete, or incomplete. In addition, TIMET's response does not address NDEP's comment. Adequate justification should be provided for the pathways that are indicated on the present CSM to be incomplete, insignificant, or "not important". USEPA risk assessment guidance and exposure assessment guidance must be followed when identifying current and future complete or potentially complete exposure pathways.
18. RTC 27, NDEP does not concur with the response and notes that all data should not be assumed to be usable until data usability is completed per the USEPA guidance. In addition, TIMET's response does not show an understanding that there are key components to a data usability evaluation other than data validation

and consideration of risk-based concentrations (e.g., defining "extent" and adequacy of reporting limits). Such key components include adequate characterization of source-related chemicals, analytical methods relative to COPCs, spatial coverage relative to exposure areas, and receptor exposure points.

19. RTC 31, TIMET's response does not address NDEP's request to split out the current and future scenario in the CSM. The future scenario exposure pathways and receptors will likely be different, relative to current scenarios, for most of the exposure areas, For example, under a future land use scenario, it is assumed that all surface soil is exposed and a building or receptor could be located anywhere within the exposure area. If area-specific rationale (e.g. analytical data) can be provided for specific HRA areas to eliminate a pathway for that area, that should be done as a component of the area-specific evaluation. Without such rationale, future pathways must initially be considered to be complete.
20. RTC 32, a pathway is considered complete until site-specific data or other specific information can provide adequate documentation to conclude otherwise. Please note that this comment also applies to RTC 33 and 41.
21. RTC 33, the NDEP notes that the CSM is the appropriate place to describe the physical features of the Site. For example, describing where surface run on or run off might occur and where this surface water might come to be located.
22. RTC 34, please note that leaching and infiltration do not have the same meaning in Soil Screening Guidance (EPA, 1996).
23. RTC 39, please note that if there is surface water at the site, then the exposure pathway is potentially complete, at least for a future receptor.
24. RTC 40, in future submittals please do not use the term "COPC" in place of "SRC". The term "COPC" should only be used in a manner that is consistent with its regulatory meaning.
25. RTC 41, NDEP disagrees with TIMET's response. Please note that the onus is not on NDEP to prove the existence of contaminants downwind relating to Site operations. It is TIMET's responsibility to prove that the pathway is not valid. Also, it is highly inappropriate for TIMET to suggest that it is necessary for NDEP to demonstrate that a garden exists downwind. The NDEP reiterates, the future, off-site, homegrown produce pathway must be addressed in future submittals.
26. RTC 46, TIMET's response is inadequate. Please note that if little is known about a potential source, all potentially relevant broad suites must be run at key locations (e.g., most likely release points) within the specific source area. Furthermore, it is NDEP's understanding that the referenced "conservatism" will include the analyses of broad suites, as applicable.
27. RTC 47, TIMET references a Figure 3-4a. This Figure was not provided. It appears that this may actually be errata Figure 1. Please advise.
28. RTC 47c, it is highly unlikely that TIMET has accurate documentation of spills and releases for the Site since operations were initiated. In addition, the records prior to the Site being occupied by TIMET are even more sparse. NDEP believes that TIMET's response to this comment is inappropriate. NDEP assumes that TIMET will address this issue through "conservatism" in future SAPs as noted in

other responses. Please advise if TIMET envisions addressing this matter in a different manner.

29. Table 3-1a, the NDEP has the following comments:
    a. The text and table are not tied together well. For example, not all of the specific operational features discussed in Section 3.1 of the text (chlorine caustic plant, magnesium plant, Units 7-13, Buildings J-3, C-9, and K-55) are tied to Table 3-1-a.
    b. The waste streams should be better tied to "source areas" so that data gaps can be more easily identified
    c. The "Known Site-Related Chemical" column should also include *potential* SRCs that might be related to the specific waste stream. For example, many of the metals that are listed in this column as "excluded" appear to be elevated in site samples compared with the background dataset.
30. Table 3-2a, the NDEP has the following comments:
    a. NDEP's review of this Table does not indicate concurrence for any future SAPs. SAP-specific comments will be generated as the SAPs are reviewed.
    b. The text and table (and figure) are not tied together well. For example, the PSAs and/or LOUs do not appear to be discussed individually in the text nor shown collectively on a figure and/or in conjunction with previous sample results.
    c. The known or potential source-related chemicals do not appear to be well thought out. For example, coke is identified as a source in the text and table for the northern storage area; however PAHs are not identified as potential source-related chemicals. Coke is listed as a major component of the J2 landfill in the text, but not listed as a "principal" source-related chemical in the table. Another example is that dioxins and furans are listed as the only chemicals to be analyzed for the S-17 landfill; it is not clear why other chemicals are not listed for the S-17 landfill or why dioxins and furans are not listed as being associated with other potential sources such as former drainage ditches, OPW, and/or chlorinator dust.
    d. If existing data are adequate for all potential S-17 landfill analytes, then those data should be brought forth to provide justification. The "Principal Chemicals" column should also include potential SRCs that might be related to the specific source.
    e. The data for the sample IDs listed in the "Sample ID Nos." column should be presented in conjunction with the other source information, and used to identify data gaps for each of the source areas.
31. Figures 5-1 through 5-5, the NDEP has the following comments:
    a. Until site characterization is complete (or at least further along), it is too premature to eliminate common pathways for some or all of the source areas. NDEP recommends that, particularly for the future unrestricted (open soil) scenario. Please note that NDEP will not issue a NFA without proper assessment of a future unrestricted (open soil) scenario.
    b. For the current scenario, NDEP is still concerned that pathways are being excluded prematurely and without the support of on-Site data. For

example, the potential for inhalation of particulates and/or vapors (derived on-Site) by downwind receptors should be determined using on-Site data. Also, "infrequent exposure" cannot be used as the basis for eliminating a pathway without some supporting site data. NDEP will require that, for each default pathway, site characterization data be used as rationale prior to the elimination of an exposure pathway. This can be done at the CSM step or the HRA step of the process. Until such rationale is provided, potential pathways cannot be eliminated.

References

U.S. EPA, 1989. Risk Assessment Guidance for Superfund, Vol. I, Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response, December. http://www.epa.gov/oswer/riskassessment/ragsa/index.htm

U.S. EPA, 1992. Guidance for Data Usability in Risk Assessment (Part A) Final, Office of Emergency and Remedial Response, PB92-963356, April.

U.S. EPA, 1996. Soil Screening Guidance: User's Guide, Office of Solid Waste and Emergency Response, EPA 540-R-96-018, July.

U.S. EPA, 2002. Elements for Effective Management of Operating Pump and Treat Systems, Office of Solid Waste and Emergency Response, December. EPA 542-R-02-009. www.epa.gov/tio